CUSTOMER NO.: 24737

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of STECKNER, et al.	Examiner: H. NGUYEN
Serial No.: 10/573,727	Art Unit: 3768
Filed: March 7, 2007	Confirmation: 2265
For: **TARGET TRACKING METHOD AND APPARATUS FOR RADIATION TREATMENT PLANNING AND DELIVERY**	
Date of Last Office Action: January 22, 2010	
Attorney Docket No.: PHUS030393US2 /PKRZ 201603US01	Cleveland, OH 44114 August 23, 2010

APPEAL BRIEF

Commissioner For Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This is an Appeal from the Final Office Action of January 22, 2010.

The Notice of Appeal was filed June 22, 2010.

An authorization to charge the 37 CFR 41.20(b)(2) Appeal Brief fee of $540 to the applicant's Deposit Account accompanies this brief.

CERTIFICATE OF ELECTRONIC TRANSMISSION

I certify that this **APPEAL BRIEF** and accompanying documents in connection with U.S. Serial No. 10/573,727 are being filed on the date indicated below by electronic transmission with the United States Patent and Trademark Office via the electronic filing system (EFS-Web).

August 23 2010
Date

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(i) REAL PARTY IN INTEREST

The Real Party in Interest is the Assignee, KONINKLIJKE PHILIPS ELECTRONICS, N.V.

(ii) RELATED APPEALS AND INTERFERENCES

None.

(iii) STATUS OF CLAIMS

Claims 1-15 stand rejected.

No claims stand allowed, confirmed, withdrawn, or objected to.

No claims have been cancelled.

The rejection of claims 1-15 (all claims) is being appealed.

(iv) STATUS OF AMENDMENTS

An Amendment is being filed concurrently with this Appeal Brief. Because the amendment only corrects minor antecedent basis issues, it is anticipated by that the amendment will be entered.

(v) SUMMARY OF CLAIMED SUBJECT MATTER

1. A target treatment apparatus for treating a target region **{130}** within a subject **{140}**, the apparatus comprising: **{p. 5, l. 9-31}**

an MRI apparatus **{100}** for generating MR images during an MR scan of the subject disposed within an examination region **{110}**; **{p. 5, l. 9-22; p. 7, l. 15-31; p. 10, l. 1-3; p. 11, l. 1-20}**

an MRI localizer **{150}** for receiving the image data from the MRI apparatus wherein the target **{130}** is localized; **{p. 5, l. 23-28; p. 7, l. 15-31}**

a reference marker localizer **{160, 160'}** for non-invasively receiving reference data from a plurality of reference points disposed in proximity to the target wherein the reference points are localized **{p. 6, l. 7-19; p. 7, l. 15-31; p. 6, l. 1-15; p. 9, l. 3-31; p. 11, l. 26 – p. 16, l. 15}**; and

a tracking processor **{300}** for receiving localized data from the MRI localizer wherein a relationship between the reference points and the target region is generated. **{p. 6, l. 16-19; p. 8, l. 9 – p. 9, l. 2; p. 9, l. 22 – p. 10, l. 3; p. 11, l. 10-25; p. 11, l. 26 – p. 16, l. 15}**

2. A target treatment apparatus as set forth in claim 1 further comprising:

a treatment controller **{460}** for receiving: (i) the relationship between the reference points and the target region from the tracking processor; and (ii) reference data from the reference marker localizer during a target treatment session, wherein an interventional tool **{400; 400'}** is controlled to treat the target **{130}**. **{p. 6, l. 20 – p. 7, l. 2; p. 9, l. 8-31}**

3. A target treatment apparatus as set forth in claim 2 wherein the plurality of reference points are defined by a plurality of external markers **{210}** disposed on the subject and the reference marker localizer comprises a plurality of video cameras **{161_1, 161_2}** for detecting the external markers **{210}**. **{p. 5, l. 9-31; p. 6, l. 1-15; p. 7, l. 3-14}**

4. A target treatment apparatus as set forth in claim 2 wherein the plurality of reference points are defined by a plurality of points on the diaphragm of the subject and the reference marker localizer comprises a navigator processor **{162'}** for identifying the reference points from a navigator scan. **{p. 10, l. 13 – o. 11, l. 20; p. 11, l. 26 – p. 16, l. 5; p. 13, l. 10-18; p. 16, l. 1-16}**

5. A target treatment apparatus as set forth in claim 4 wherein the interventional tool comprises a focused ultrasound ablator **{400'}** disposed within the examination region. **{p. 11, l. 21-25; p. 16, l. 6-14}**

6. A method of treating a target region **{130}** within a subject **{140}**, the method comprising: **{p. 5, l. 9-31}**

generating magnetic resonance images of the subject disposed within an examination region **{110}**; **p. 5, l. 9-22; p. 7, l. 15-31; p. 10, l. 1-3; p. 11, l. 1-20}**

localizing the target region **{130}** from the MR images; **{p. 5, l. 23-28; p. 7, l. 15-31}**

non-invasively localizing a plurality of reference points disposed in proximity to the target **{p. 6, l. 7-19; p. 7, l. 15-31; p. 6, l. 1-15; p. 9, l. 3-31; p. 11, l. 26 – p. 16, l. 15}**; and

generating a relationship between the reference points and the target region. **{p. 6, l. 16-19; p. 8, l. 9 – p. 9, l. 2; p. 9, l. 22 – p. 10, l. 3; p. 11, l. 10-25; p. 11, l. 26 – p. 16, l. 15}**

7. A method as set forth in claim 6 further comprising:

localizing at least a sub-set of the reference points during a treatment session; and

controlling an interventional tool **{400, 400'}** based on the localized reference points from the treatment session which serve as input to the relationship between the reference points and the target region to estimate the location of the target. **{p. 6, l. 20 – p. 7, l. 2; p. 9, l. 8-31}**

8. A method as set forth in claim 6 wherein the plurality of reference points are defined by a plurality of external markers **{210}** disposed on the

subject and the reference markers are localized using a plurality of video cameras **{161_1, 161_2}**. **{p. 5, l. 9-31; p. 6, l. 1-15; p. 7, l. 3-14}**

9. A method as set forth in claim 6 wherein the plurality of reference points are defined by a plurality of points on the diaphragm of the subject and the reference points are localized using a navigator processor **{162'}**. **{p. 10, l. 13 – o. 11, l. 20; p. 11, l. 26 – p. 16, l. 5; p. 13, l. 10-18; p. 16, l. 1-16}**

10. A method set forth in claim 7 wherein the interventional tool comprises a focused ultrasound ablator **{400'}**. **{p. 11, l. 21-25; p. 16, l. 6-14}**

11. An apparatus for treating a target region **{130}** within a subject **{140}**, the apparatus comprising: **{p. 5, l. 9-31}**

means **{100}** for generating magnetic resonance images of the subject disposed within an examination region; **{p. 5, l. 9-22; p. 7, l. 15-31; p. 10, l. 1-3; p. 11, l. 1-20}**

localizing means **{150}** for localizing the target region from the MR images; **{p. 5, l. 23-28; p. 7, l. 15-31}**

reference means **{160, 160'}** for non-invasively localizing a plurality of reference points disposed in proximity to the target **{p. 6, l. 7-19; p. 7, l. 15-31; p. 6, l. 1-15; p. 9, l. 3-31; p. 11, l. 26 – p. 16, l. 15}**; and

modeling means **{300}** for generating a relationship between the reference points and the target region. **{p. 6, l. 16-19; p. 8, l. 9 – p. 9, l. 2; p. 9, l. 22 – p. 10, l. 3; p. 11, l. 10-25; p. 11, l. 26 – p. 16, l. 15}**

12. An apparatus as set forth in claim 11 further comprising:

means **{160, 160'}** for localizing at least a sub-set of the reference points during a treatment session; and

interventional means **{460}** for controlling an interventional tool **{400, 400'}** based on the localized reference points from the treatment session which serve as input to the relationship between the reference points and the target region to estimate the location of the target. **{p. 6, l. 20 – p. 7, l. 2; p. 9, l. 8-31}**

13. An apparatus as set forth in claim 11 wherein the plurality of reference points are defined by a plurality of external markers **{210}** disposed on the subject and the reference markers are localized using a plurality of video cameras **{161_1, 161_2}. p. 5, l. 9-31; p. 6, l. 1-15; p. 7, l. 3-14}**

14. An apparatus as set forth in claim 11 wherein the plurality of reference points are defined by a plurality of points on the diaphragm of the subject and the reference points are localized using a navigator processor **{162_1}. {p. 5, l. 9-31}**

15. An apparatus as set forth in claim 12 wherein the interventional tool comprises a focused ultrasound ablator **{400'}. {p. 11, l. 21-25; p. 16, l. 6-14}**

(vi) GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether claims 1-4, 6-9, and 11-14 are fully anticipated in the sense of 35 U.S.C. § 102 by Schweikard (US 6,501,981).

Whether claims 5, 10, and 15 are patentable in the sense of 35 U.S.C. § 103 over Schweikard as modified by Acker (US 6,374,132).

(vii) ARGUMENT

A. Claims 1-5 Are Not Anticipated By Schweikard

One acknowledged prior art technique for tracking the moving tumor is to implant internal markers to or at locations very near the target such that the markers move the same as the target (present application, page 2, lines 25-30). One drawback to this tracking technique is that it involves an invasive procedure in order to implant the internal markers. Moreover, the implanted internal markers can migrate and produce erroneous or misleading information (present application, page 3, lines 1-3).

Schweikard is exemplary of this acknowledged prior art. The Schweikard technique requires the implantation of internal markers **152** (column 5, line 49 – column 6, line 50). Thus, Schweikard requires invasively implanting internal markers **152** for proper functioning. In the embodiment of Figure 8, Schweikard uses internal markers and one or more external markers **180** (column 6, line 51 – column 7, line 15). Schweikard teaches against the use of only external markers and indicates that the invasively implanted internal markers are necessary, stating starting at column 6, line 65:

> If only external markers are used to compensate for the motion of the patient, however, they cannot accurately reflect the internal motion of the target organ since the target organ may move a small amount when the external marker may move a larger amount and vice versa. The external markers are not sufficiently precise to compensate for the motion of the patient. Therefore, the combination of the internal markers and the external markers is necessary in order to accurately track the motion of the target organ.

Claim 1 calls for a reference marker localizer for non-invasively receiving reference data from a plurality of reference points disposed in proximity to the target, wherein the reference points are localized. By contrast, Schweikard (column 6, line 66 – column 7) requires the invasive implantation of internal markers **152** in order to localize reference points, particularly the internal markers **152**, which are disposed in proximity to the target. Even though the embodiment of Figure 8 of Schweikard may include one or more external markers, as quoted above, the invasive implantation of internal markers **152** of Schweikard is a necessary act for localizing the reference points.

Because reference marker localization in Schweikard requires invasive implantation of the internal markers **152**; whereas, claim 1 calls for the reference marker localizer to non-invasively receive reference data from the plurality of reference points, it is submitted that claim 1 is not anticipated by Schweikard.

Further, claim 1 calls for an MRI apparatus for generating MR images during an MR scan of the subject and an MRI localizer for receiving image data from the MRI apparatus wherein the target is localized. A tracking processor receives the localized data from the MRI localizer and a relationship between the reference markers and the target region is generated. Schweikard mentions MRI in passing for generating a pretreatment anatomical image of the subject, but only discloses x-ray imaging and x-ray localization of the target in sufficient detail to make and use. For example, Schweikard calls for the internal markers **152** to be made of gold (column 5, line 67 – column 6, line 1) which is heavy metal that is x-ray opaque. However, magnetic resonance imaging requires the excitation of resonance in a dipole, typically the hydrogen or proton dipole. Gold does not have a dipole which is imageable in magnetic resonance imaging systems, at least not in any commercially available magnetic resonance imaging system.

For the reasons set forth above, it is submitted that **claim 1 and claims 2-4** are not anticipated by Schweikard, **and** that **claim 5 dependent therefrom** distinguishes patentably over Schweikard and the other references of record.

B. Claim 3 is Not Anticipated by Schweikard

Claim 3 calls for the plurality of reference points to be defined by a plurality of external markers disposed on the subject. Claim 3, by virtue of its dependence on claim 2, also calls for the treatment controller to control the interventional tool based on the reference marker data. As set forth in column 6, line 66 – column 7, line 7, Schweikard states that not only are the internal markers used to control the interventional tool, but that the external marker(s) is too inaccurate to use.

Claim 3 also calls for receiving the relationship between the reference points and the target region. Rather than determining the relationship of the external

marker(s) to the target region, Schweikard determines the relationship between the internal and external markers (column 7, lines 11-15).

Accordingly, it is submitted that **claim 3** is not anticipated by Schweikard.

C. Claim 4 is Not Anticipated by Schweikard

Navigators are a type of magnetic resonance imaging sequence. Typically, a small fixed region, such as a line or slice, which intersects moving tissue, such as a diaphragm, is repeatedly excited to resonance. The voxels which correspond to selected tissue, such as a diaphragm, are automatically identified in the received resonance signals/echoes by a navigation processor. By monitoring where the diaphragm or other target tissue is located within the fixed magnetic resonance excitation region, one can monitor movement of the diaphragm or other moving tissue. By contrast, Schweikard merely mentions magnetic resonance imaging in passing, such as for generating an anatomical image used for planning, and proceeds to describe an x-ray based imaging sequence for monitoring motion in detail. There is no disclosure, reference or suggestion in Schweikard of a navigation processor, navigator echoes, navigator sequences, MR navigators, or the like. Accordingly, **claim 4** is not anticipated by Schweikard.

D. Claim 5 is Patentable Over the References of Record

Claim 5 calls for the interventional tool to be disposed within the examination region, which examination region is described in parent claim 1 as being the examination region of the MRI apparatus which generates MR images during an MR scan of the subject. That is, the interventional tool must be disposed within the examination region of an MRI apparatus. In Schweikard, Figures 1 and 3 are directed to radiation treatment devices. They are not directed to MR imaging devices. Rather, it is submitted that the diagnostic images discussed in Schweikard come from a separate apparatus. There is no suggestion in Schweikard that the beaming apparatus **20** which emits the collimated ionizing beam directed at the target region be disposed in an examination region of a diagnostic imaging apparatus. Indeed, it is submitted that the constructions illustrated in Figures 1 and 3 of Schweikard, if disposed within

the examination region of an MR imaging apparatus, would interfere with the diagnostic imaging procedure. Claim 5 is limited to an MRI apparatus. MRI imaging apparatuses are placed in a shielded room, kept distant from ferrous materials, and the like. It is submitted that the beaming apparatus of Schweikard would so interfere with the MRI apparatus as to render it inoperative for its intended purpose. Conversely, the strong magnetic and RF fields of an MRI apparatus can interfere with the x-ray locator of Schweikard. For example, the magnetic fields and the magnetic field gradient pulses deflect the electron beam of vacuum tubes, such as x-ray tubes.

It is noted that the treatment device **10** of Schweikard does include a pair of orthogonal x-ray generators and receivers which generate and receive a narrow beam **26**, **28**. These beams are not used for generating the diagnostic image of the subject. Rather, these beams are used to track, e.g., by triangulation, the locations of the implanted markers **152** and to generate images of the target region **18**. The image of the target region is not the same as the MR images called for in claim 1. Rather, the images generated by the receivers **34** and **36** are only of the target region and cannot be properly aimed or positioned until a localizer localizes the target in the image data of the MRI apparatus. That is, another larger image of the patient is needed in order to identify the location of the target region so that the x-ray sources **30**, **32** and receivers **34**, **36** and the patient can be appropriately arranged relative to each other such that the target region falls at the crossing point of the radiation beams **26**, **28**. Thus, the x-ray sources **30**, **32** and receivers **34**, **36** do not generate images, much less MR images, of such a scale that a localizer localizes the target within the image.

Acker does disclose an ultrasound unit. However, the Examiner fails to explain why or how one would be motivated to, much less how one would physically place the ultrasound device **16, 216, 316** of Acker into the treatment region of Schweikard. Indeed, because the ultrasound device **16**, **216**, **316** of Acker is disposed outside of the examination region of the MR device **12**, **212**, **312** of Acker, it is submitted that Acker teaches against placing an ultrasound ablator in the examination region of an MRI device.

Accordingly, it is submitted that **claim 5** distinguishes patentably and unobviously over the references of record.

E. Claim 6 is Not Anticipated by Schweikard

Claim 6 calls for generating magnetic resonance images of a subject disposed within an examination region and localizing the target region of the MR images. X-ray sources **30**, **32** and x-ray receivers **34**, **36** of Schweikard only image the target area. There is no localizer for localizing the target area from images produced by the receivers **34**, **36**.

Claim 6 further calls for non-invasively localizing a plurality of reference points disposed in proximity to the target. In Schweikard, the implanted, internal reference markers **152** are invasively implanted into the patient. Hence, localizing the internal markers **152** is an invasive rather than a non-invasive localizing process. Although the embodiment of Figure 8 of Schweikard does mention external markers **180**, Schweikard specifically says that the external markers alone are not sufficient for determining internal motion of the target (column 6, line 66 – column 7, line 7). Thus, even if an external marker is used, the invasively implanted internal markers are still necessary in Schweikard.

Claim 6 further calls for generating a relationship between the reference markers and the target region. Schweikard does determine a relationship between the internal, invasively implanted markers **152** of the target region. However, in Figure 8, when the external marker **180** is utilized, Schweikard determines the relationship between the internal and external markers (column 7, lines 11-15).

Accordingly, it is submitted that **claim 6 and claims 7, 8, and 9 dependent therefrom** are not anticipated by Schweikard and that **claim 10**, dependent therefrom, is patentably distinct from Schweikard.

F. Claim 8 is Not Anticipated By Schweikard

Claim 8 calls for the reference points to be defined by external markers, and for the markers to be localized using video cameras. Although the embodiment of Figure 8 of Schweikard does have an external marker **180**, it is the internal markers **152** which are utilized to generate the relationship relative to the target region. Schweikard, at column 6, line 66 – column 7, line 7, specifically

teaches that the external markers **180** are not adequate for this purpose. The internal markers which perform this function are tracked by the x-ray sources **30**, **32** and receivers **34**, **36** and not by video cameras.

Accordingly, it is submitted that claim 8 is not anticipated by Schweikard.

G. Claim 9 is Not Anticipated By Schweikard

Claim 9 calls for the reference points to be on the diaphragm of the subject. Schweikard does not disclose implanting the internal markers **152** in the diaphragm of a subject. Rather, the internal markers are attached to or positioned near the target organ **151**.

Moreover, points on the diaphragm of the treated subject of Schweikard are not localized using a navigator processor. Schweikard discloses using x-ray sources **30**, **32** and receivers **34**, **36** to track the internal markers **152**. There is no suggestion in Schweikard of using an MR navigator sequence to generate navigator echoes which are analyzable by a navigator processor to determine the location of a plurality of points on the diaphragm of the subject.

Accordingly, it is submitted that **claim 9** is not anticipated by Schweikard.

H. Claims 11-14 Are Not Anticipated By Schweikard and Claim 15 Distinguishes Patentably Over the References of Record

Claim 11 calls for means for generating magnetic resonance images and means for localizing the target region in the MR images. The x-ray sources **30**, **32** and the receivers **34**, **36** only view the target region after it has been localized and are not used as part of a localization process.

Claim 11 calls for reference means for non-invasively localizing a plurality of reference points disposed in proximity to the target. The internal markers **152** of Schweikard are invasively implanted into the target or nearby locations. Hence, the implanted markers **152** are an invasive localizing means.

Claim 11 further calls for a modeling means for generating a relationship between the reference points and the target region. Although the

embodiment of Figure 8 of Schweikard does include external markers **180**, Schweikard determines the relationship between the external markers **180** and the internal markers **152** (column 7, lines 11-15). Schweikard specifically teaches that the external markers do not accurately reflect the internal motion of the target and cannot be used without the invasively implanted internal markers **152** (column 6, line 66 – column 7, line 7). Rather, Schweikard localizes based on the invasively implanted internal markers **152**.

Accordingly, it is submitted that **claim 11** is not anticipated by Schweikard.

I. Claim 13 is Not Anticipated By Schweikard

Claim 13 calls for the plurality of reference points whose relationship to the target region is determined, to be external markers. Schweikard determines the relationship of internal markers **152** to the target. Rather than determining the relationship of the external markers **180** to the target, Schweikard determines the relationship between the internal and external markers (column 7, lines 11-15). Schweikard specifically teaches that the external markers alone are insufficient to compensate for patient motion (column 6, line 6 – column 7, line 7).

Claim 13 calls for the markers whose relationship to the target region is generated to be localized using video cameras. The internal markers **152** of Schweikard are not visible by video cameras.

Accordingly, it is submitted that **claim 13** is not anticipated by Schweikard.

J. Claim 14 is Not Anticipated By Schweikard

Claim 14 calls for the plurality of reference points to be defined by a plurality of points on the diaphragm. By contrast, Schweikard calls for invasively implanted internal markers **152** which are invasively implanted in or near the target. There is no suggestion of defining points on the diaphragm of the subject.

Claim 14 also calls for localizing the reference points using a navigator processor. Although Schweikard suggests that a three-dimensional image of the

subject can be generated by magnetic resonance imaging (column 4, lines 22-23), such magnetic resonance imager is separate from the radiation treatment device **10**, e.g., used for planning a subsequent treatment session. Because the magnetic resonance imager of Schweikard is separate from the treatment device **10** of Schweikard, the magnetic resonance imaging device of Schweikard cannot generate the navigator sequences, echoes, or data which would be used by a navigator processor to localize reference points on the diaphragm.

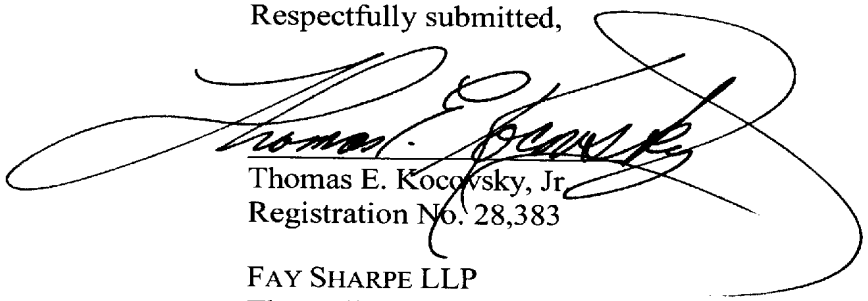
Indeed, Schweikard teaches against localizing reference points on the diaphragm with a navigator processor in favor of localizing internal markers **152** with x-ray sources **30**, **32** and receivers **34**, **36**.

Accordingly, it is submitted that **claim 14** is not anticipated by Schweikard.

K. Conclusion

For the reasons set forth above, it is submitted that no claims are anticipated by Schweikard and that all claims distinguish patentably and unobviously over the references of record. An early reversal of all of the Examiner's rejections is requested.

Respectfully submitted,



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(viii) CLAIMS APPENDIX

1. (Rejected) A target treatment apparatus for treating a target region within a subject, the apparatus comprising:

an MRI apparatus for generating MR images during an MR scan of the subject disposed within an examination region;

an MRI localizer for receiving the image data from the MRI apparatus wherein the target is localized;

a reference marker localizer for non-invasively receiving reference data from a plurality of reference points disposed in proximity to the target wherein the reference points are localized; and

a tracking processor for receiving localized data from the MRI localizer wherein a relationship between the reference points and the target region is generated.

2. (Rejected) A target treatment apparatus as set forth in claim 1 further comprising:

a treatment controller for receiving: (i) the relationship between the reference points and the target region from the tracking processor; and (ii) reference data from the reference marker localizer during a target treatment session, wherein an interventional tool is controlled to treat the target.

3. (Rejected) A target treatment apparatus as set forth in claim 2 wherein the plurality of reference points are defined by a plurality of external markers disposed on the subject and the reference marker localizer comprises a plurality of video cameras for detecting the external markers.

4. (Rejected) A target treatment apparatus as set forth in claim 2 wherein the plurality of reference points are defined by a plurality of points on the diaphragm of the subject and the reference marker localizer comprises a navigator processor for identifying the reference points from a navigator scan.

5. (Rejected) A target treatment apparatus as set forth in claim 4 wherein the interventional tool comprises a focused ultrasound ablator disposed within the examination region.

6. (Rejected) A method of treating a target region within a subject , the method comprising:

generating magnetic resonance images of the subject disposed within an examination region;

localizing the target region from the MR images;

non-invasively localizing a plurality of reference points disposed in proximity to the target; and

generating a relationship between the reference points and the target region.

7. (Rejected) A method as set forth in claim 6 further comprising:

localizing at least a sub-set of the reference points during a treatment session; and

controlling an interventional tool based on the localized reference points from the treatment session which serve as input to the relationship between the reference points and the target region to estimate the location of the target.

8. (Rejected) A method as set forth in claim 6 wherein the plurality of reference points are defined by a plurality of external markers disposed on the subject and the reference markers are localized using a plurality of video cameras.

9. (Rejected) A method as set forth in claim 6 wherein the plurality of reference points are defined by a plurality of points on the diaphragm of the subject and the reference points are localized using a navigator processor.

10. (Rejected) A method set forth in claim 7 wherein the interventional tool comprises a focused ultrasound ablator.

11. (Rejected) An apparatus for treating a target region within a subject, the apparatus comprising:

means for generating magnetic resonance images of the subject disposed within an examination region;

localizing means for localizing the target region from the MR images;

reference means for non-invasively localizing a plurality of reference points disposed in proximity to the target; and

modeling means for generating a relationship between the reference points and the target region.

12. (Rejected) An apparatus as set forth in claim 11 further comprising:

means for localizing at least a sub-set of the reference points during a treatment session; and

interventional means for controlling an interventional tool based on the localized reference points from the treatment session which serve as input to the relationship between the reference points and the target region to estimate the location of the target.

13. (Rejected) An apparatus as set forth in claim 11 wherein the plurality of reference points are defined by a plurality of external markers disposed on the subject and the reference markers are localized using a plurality of video cameras.

14. (Rejected) An apparatus as set forth in claim 11 wherein the plurality of reference points are defined by a plurality of points on the diaphragm of the subject and the reference points are localized using a navigator processor.

15. (Rejected) An apparatus as set forth in claim 12 wherein the interventional tool comprises a focused ultrasound ablator.

(ix) EVIDENCE APPENDIX

None.

(x) RELATED PROCEEDINGS APPENDIX

There are no related decisions by a Court or the Board in related proceedings.